

BLACK'S  
CHEMICAL  
DICTIONARY



# HACKH'S CHEMICAL DICTIONARY

*[American and British Usage]*

*Containing the Words Generally Used in Chemistry,  
and Many of the Terms Used in the Related  
Sciences of Physics, Astrophysics, Mineralogy,  
Pharmacy, Agriculture, Biology,  
Medicine, Engineering, etc.*

*Based on Recent Chemical Literature*

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hydrochloric acid (the *kinase*) into pepsin (the *active enzyme*). (3) Excitation. (4) Irradiation. (5) A. of carbon, e.g., by heating with steam, or sulfuric acid.

**activator.** (1) A catalyst. (2) A substance used in flotation to produce a coating having metallic properties, as, sodium sulfide for lead carbonate ores.

**activatory.** See *phase*.

**active.** (1) Dynamic or working, as opposed to static or inert. (2) Having optical properties, as an asymmetric carbon atom. Cf. *optical activity*.

**surface-** See *surfactant*.

**a. deposit.** The formation of a radioactive layer on a substance exposed to radio elements. **a. immunity.** The stimulation of an organism to produce substances protective against infection by bacteria. **a. immunization.** The processes by which the protective agencies of an organism are made resistant to bacterial invasion. **a. mass.** The number of moles (gram molecules) in a unit volume (1 liter). **a. oxygen test.** A test for rancidity in fats, by the liberation of iodine from potassium iodide in acetic acid. **a. principle.** The substance responsible for the physiological action of a drug; e.g., an alkaloid.

**activin.** An organic iodine compound of casein used medicinally.

**activity.** (1) The rate in watts at which work is performed. Cf. *action*. (2) The ratio of the escaping tendency (*fugacity*) of two phases at the same temperature. A correction applied to the concentration of a strong electrolyte, to satisfy Ostwald's dilution law, q.v. (3) A measure of interionic forces. Cf. *a. coefficient*, *amylolytic*. Digestive power of amylase. **excited-** Active deposit. **ionic-** Thermodynamic concentration. In a dilute solution which obeys the gas laws, the i.a. equals the concentration; in other solutions the value which ensures that the gas laws hold. **optical-** The capacity of a substance to rotate the plane of polarized light. **peptic-** Digestive power of pepsin. **radio-** See *radioactivity*. **tryptic-** Digestive power of trypsin.

**a. of activated carbon.** The percentage of carbon disulfide vapor absorbed by carbon (generally 50%).

**a. coefficient.** The ratio *a/c*, see *activity* (2).

**actol.** Silver lactate.

**actomyosin.** A combination of actin and myosin, q.v., which comprises the tractile muscle system.

**acton.** Ethyl orthoformate.

**actor.** A compound which takes part in both primary and secondary reactions. See *induced reactions*.

**acute.** Quick, short, or sharp. Cf. *chronic*. **a. poisoning.** See *poisoning*.

**acyclic.** Describing organic compounds which contain no ring system; as, the methane series. Synonym: Aliphatic (chains). Antonym: Cyclic, aromatic (rings).

**acyl.** An organic radical derived from an organic acid by the removal of the hydroxyl group; e.g.,  $R\text{-CO-}$  is the a. radical of  $R\text{-CO-OH}$ . See *acetyl*, *benzenesulfonyl*, *benzoyl*, etc. **a. derivative.** An organic compound containing an a. radical; e.g., amides,  $R\text{-CO-NH}_2$ . **a. radical.** Acyl.

**acylation.** Acylation. The formation or introduction of an acyl radical in or into an organic compound.

**acyloin.**  $R\text{-CO-CHOH-R}$ . An organic compound formed by condensation of aldehydes, as,  $\text{Ph-CO-CHOH-Ph}$ , benzoin.

**acrol.** An ammoniacal solution of zinc and copper phenolates; a wood preservative.

**adoline.**  $\text{Et}_2\text{CBr-CO-NH-CO-NH}_2 = 237.1$ . Carbomal,  $\alpha$ -bromo- $\alpha$ -ethylbutyrylurea. White crystals, m.116, slightly soluble in water; a hypnotic and sedative.

**adamant.** A hard mineral; as, diamond.

**adamantine.** Diamond. **a. boron.** See *boron*. **a. spar.** A dark gray, smoky variety of corundum from India; green in transmitted light.

**adamellose.** An igneous andesite-diorite rock containing hornblende, feldspar, quartz, chlorite, agnetite, apatite, and rutile (Pigeon Point, Minn.).

**Adam galactometer.** A graduated buret with two glass bulbs, used in milk analysis.

**adamine.** Adamite.

**adamate.**  $\text{Zn}_2\text{HAsO}_4$ . Adamine. A native arsenate; yellow orthorhombic crystals (Chile, Greece).

**Adamkiewicz reaction.** Protein solutions give a violet ring when layered on glacial acetic acid and concentrated sulfuric acid.

**adamon.** Dibromodihydrocinnamic acid ester of borneol; a sedative and anaphrodisiac.

**adamsite.** (1) A greenish-black mica. (2) Diphenylamine chlorarsine. *Adansonia digitata* (Bombacaceae), the baobab tree of Africa, yields edible bou or monkey bread. The bark is an emollient; the dried leaves, lalo, are an antipyretic; the fibers are suitable for paper.

**adansonine.** An alkaloid from the bark and leaves of *Adansonia digitata*. Colorless white crystals; a febrifuge.

**adaptation.** The advantageous adjustment of an organism to a change in its surrounding.

**adapter.** A tapered glass tube used to connect a retort or condenser with the receiving vessel.

**adatom.** An atom adsorbed on a surface so that it will migrate over the surface like a two-dimensional gas. Cf. *adion*.

**addiction.** Devotion to or the habitual use of a substance or practice. **a.-producing drugs.** Drugs subjected to international control by the World Health Organization because of their a.-producing powers.

**addition.** A chemical reaction which involves no change of valency; usually the union of two binary molecules to form a more complex compound; as,  $\text{HCl} + \text{NH}_3 = \text{NH}_4\text{Cl}$ . **a. compound.** Adduct. An inorganic compound formed by addition; e.g.,  $\text{NH}_4\text{Cl}$ .

**additive.** Added to. **a. compound.** An organic compound formed by the saturation of one or more double or triple bonds of an unsaturated compound; e.g., benzene hexachloride,  $\text{C}_6\text{H}_6\text{Cl}_6$ , is an additive compound of benzene. **a. property.** A property of a molecule which is the sum of the individual properties of the atoms or linkages composing it; thus, when the molecular refractivity of a molecule is the sum of the atomic refractivities of its atoms.

**adduct.** Addition group or compound.

**adduction.** Oxidation.

**adelgesin.**  $\text{C}_{23}\text{H}_{28}\text{O}_{15} = 544.3$ . Light brown needles, m.205. A glucosidal constituent of the bark of "pineapple" gall, produced by *Adelges abietis*.

**adelite.** Mg wagnerite  
adelomorphi indefinite

**adenantherit** physostig (Legumin)

**adenase.** A which hyc

**adenine.** C<sub>10</sub> purine ba in the pan slightly sc

**adenocarpine** resting me

**adenos.** A t side. A t adenine a

**adenosine.** a soluble in acid. **a.**

**adenylic acid** sinephosph

corpuscles and phosph

lowers the Cf. *adenin*

**adeps.** Any lanae. La

**adermin.** T from yeast

**adfluxion.** adglutinate.

**adhatotic** ac of *Adhatoc*

**adhere.** To substance.

**adhesion.** T unlike me adsorption

**adhesive.** A materials determine

**adiabatic.** z gain of he An instru

there is a a. elastic

undergoin of heat; c

expansion cooling effi

out so tha adiactinic.

photochen adicity. Va

adinole. A albite.

**adion.** An adipaldehyde dial\*, adip adipamide.

diamide, 1 mide, m.2

Colorless liquid with characteristic odor, b.46.2, slightly soluble in water; a local anesthetic, and a solvent for sulfur, iodine, rubber. **c. group.** The fourth group of the periodic system, q.v. **c. hexachloride.**  $C_2Cl_6$  = 236.77. **C.** trichloride, ethyl perchloride, hexachloroethane. Colorless crystals, m.182, b.187, insoluble in water. **c. isotopes.** **C.** has 5 isotopes of atomic weights 10-14;  $C^{12}$  and  $C^{13}$  only are stable.  $C^{13}$  is used as a tracer element in nutritional work. **c. light.** An electric arc light with C. electrodes. **c. monosulfide.**  $CS = 44.04$ . Colorless gas, b. = 130, very unstable and polymerizes to a red solid. **c. monoxide.**  $CO = 28.01$ . Colorless poisonous gas, b. = 190, slightly soluble in water, formed during incomplete combustion of C. **c. oxysulfide.**  $COS = 60.07$ . Carbonyl sulfide. Colorless gas, b.50.2, slightly soluble in water, explosive in air. **c. paper.** A tissue paper coated with a mixture of a wax and a black pigment (often c. black); used to make copies of writing. **c. print.** A photographic process for artistic reproductions of negatives. **c. residue.** Conradson c. The amount of c. produced from a lubricating oil heated in a closed crucible under standard conditions. **c. subnitride.** Acetylene dinitride. **c. suboxide.**  $O:C:C:C:O = 68.02$ . A pungent lacratory colorless gas, b.7, decomp. by water to malonic acid. **c. subsulfide.**  $C_3S_2 = 100.0$ . Red pungent liquid, m. = 0.5, polymerized by heat. **c. tetrabromide.**  $CBr_5 = 331.85$ . Tetrabromomethane\*. Colorless scales, d.3.42, m.92, insoluble in water. **c. tetrachloride.**  $CCl_4 = 153.84$ . Tetrachloromethane\*, phenoxin, Pyrex. Colorless liquid, b.76, slightly soluble in water. A local anesthetic, fire extinguisher, nonflammable solvent, cleaning agent, (benzene substitute), and reagent. **c. tetrafluoride.**  $CF_4 = 88.0$ . Tetrafluoromethane\*, fluoromethane. Colorless gas, b. = 126, by-product in the manufacture of aluminum from cryolite. **c. tetraiodide.**  $CI_4 = 519.84$ . Tetraiodomethane\*. Red crystals, d<sub>20</sub><sup>20</sup> 4.32, decomp. by heat, insoluble in water. **c. trichloride.** Hexachloroethane.

**carbonaceous.** Containing carbon.

**carbonado.** Bort. A hard, black cutting diamond.

**carbonatation.** Formation of carbonates by carbon dioxide. Cf. *carbonation*.

**carbonate.** A salt of the theoretical carbonic acid, containing the radical  $CO_3^{2-}$ . Carbonates are readily decomposed by acids. The carbonates of the alkali metals are water-soluble; all others are insoluble. **bi-** Acid c. A salt containing the radical  $HCO_3^-$ . **chloro-** See *chloro-c.*

**c. minerals.** Rock-forming minerals; as, calcite,  $CaCO_3$ ; dolomite,  $CaMg(CO_3)_2$ ; magnesite,  $MgCO_3$ ; siderite,  $FeCO_3$ .

**carbonation.** (1) Carbonization. (2) The precipitation of lime by carbon dioxide, e.g., in sugar refining. (3) The saturation of water with carbon dioxide, e.g., in soda-water manufacture.

**carbonic.** A compound containing tetravalent carbon. Cf. *carbonium*.

**carbonic acid.** (1)  $HO-COOH$ . *m*-Carbonic acid, hydroxyformic acid. The hypothetical acid of carbon dioxide and water; known only as its salts (carbonates), acid salts (bicarbonates), amides (carbamic acid) and acid chlorides (carbonyl chloride). (2) An old term for carboxylic acid.

**ortho-**  $C(OH)_4$ . Exists only as compounds, e.g., esters.

**c. acid ester.** An organic compound in which the H of c. acid is substituted by a radical. *meta*-Compounds of the general formula  $RO-CO-OR$ . **ortho-** Compounds of the general formula  $C(OR)_4$ . **c. acid hydrate.**  $CO_2 \cdot 6H_2O$ .

**carbonic anhydrase.** An intracellular enzyme occurring in high concentrations in red-blood corpuscles. It catalyzes the reversal of the reaction  $CO_2 + H_2O \rightleftharpoons H_2CO_3$ .

**carbonic anhydride.** Carbonic acid.

**carbonic ester.** Carbonic acid ester. **ethyl-**  $CO(OEt)_2 = 118.1$ . Colorless liquid, b.126. **ethylene-**  $CO(OCH_2CH_3)_2 = 114.1$ . Colorless crystals, m.39. **methyl-**  $CO(OMe)_2 = 90.1$ . Colorless liquid, b.91. **methylethyl-**  $EtO-CO-OMe = 104.1$ . Colorless liquid, b.109. **methylpropyl-**  $PrO-CO-OMe = 118.1$ . Colorless liquid, b.131.

**carbonic ether.** Ethyl carbonate.

**carbonide.** Carbide.

**carboniferous.** (1) Containing carbon. (2) Belonging to the coal age; see *geologic era*.

**carbonite.** (1) Small charcoal briquettes. (2) A high explosive: nitroglycerin 17-30, sodium nitrite 24-30, flour 37-44%.

**carbonitrile.** Cyanido, nitrile. The radical  $\sim CN$ , indicated by the prefix *cyanono-*, or the suffix *-nitrile* or *-carbonitrile*.

**carbonium.** Describing: (1) a compound with divalent or trivalent carbon, associated with chemical color and reactivity; (2) the ion  $R_3C^+$ .

**carbonization.** (1) The transformation of organic matter into charcoal. (2) The distillation of coal, as in gas manufacture. **high temperature-** Heating coal out of air at 1000-1300°C, with the formation of gas, tar, oil, ammonia, and coke. **low temperature-** Heating coal at 450-700°C, with the formation of gas, petroleum (hydrocarbons from pentane to octane, and amylenes to octene), and coke.

**carbonize.** To convert to carbon by charring or burning incompletely.

**carbonizer.** Concentrated aluminum chloride solution; removes cellulose from wool.

**carbonoid.** A suggested tetragonal structure of carbon, with 4 faces, one for each valency. Cf. *benzenoid*.

**carbonometer.** A device to determine the carbonic acid content of blood. Cf. *carbometer*.

**carbonoxysulfide.** Carbon oxysulfide.

**carbon rheostat.** An electrical resistance consisting of a number of carbon plates mounted so that pressure can be placed on them by a screw and their total resistance thus altered.

**carbonyl.** The radical  $\sim CO$ . Cf. *carbonyls*, *thionyl*.

**c. amidophenol.** Oxybenzoazole. **c. bromide.**  $COBr_2 = 187.83$ . Bromophosgene. Poisonous liquid, b.64.5. **c. chloride.**  $COCl_2 = 98.92$ . Phosgene. Poisonous gas, b.8.2, decomp. by water; an important chemical intermediate, e.g., in the manufacture of polyurethane resins. World production (1960), 10,000 tons. **c. dioxy.** The radical  $\sim O-CO-O$ . **c. diurea.**  $(NH_2-CO-NH)_2CO = 146.06$ . Triuret. White crystals, m.232, insoluble in water. Cf. *biuret*. **c. hemoglobin.** A highly poisonous combination of carbon monoxide and hemoglobin. **c. pyrrole.**  $CO(C_4H_4N)_2 = 160.1$ .

Colorless crystals, m.63. **c. sulfide.** Carbon oxy-sulfide. **c. thiocarbonanilide.**  $C_2ON_2SPh = 254.1$ . Colorless crystals, m.87. **thio-c. thiocarbonanilide.**  $C_2N_2S_2Ph_2 = 270.1$ . Colorless crystals, m.79.

**carbonyles.** Carboxides. Compounds of carbon monoxide and metals, some volatile; as, nickel carbonyl.

**carboraffin.** An activated charcoal, used chiefly for decolorizing sugar solutions.

**Carborundum.** Trademark for certain silicon carbide and other abrasives.

**carbosant.**  $(C_{15}H_{23})_2O-COO(C_{15}H_{23}) = 466.37$ . Santalyl carbonate. Carbonic acid ester of sandalwood oil. Yellow oil, insoluble in water.

**Carbosorb.** A grade of Ascarite.

**carbostyryl.**  $C_9H_7ON = 145.15$ . 2-Hydroxyquinoline, 2(1)-quinolone. Colorless prisms, m.199, slightly soluble in water. **ethyl-** See *ethyl-c. hydro-*  $C_9H_9ON = 147.15$ . Colorless crystals, m.163. **hydroiso-**  $C_9H_9ON = 147.15$ . Crystals, m.71. **iso-**  $C_9H_9ON = 145.15$ . Crystals, m.208. **methyl-**  $C_9H_9ON = 145.15$ . Crystals, m.190.2. Colorless Lepidone. **nitro-**  $C_9H_8O_3N_2 = 190.2$ . Colorless crystals, m.168. **octohydro-**  $C_9H_{15}ON = 153.19$ . Crystals, m.151. **oxy-**  $C_9H_7O_2N = 161.16$ . Colorless crystals, m.300. **pseudo-**  $C_9H_9ON = 145.15$ .

**carbostyrylic acid.** Kynurenic acid.

**Carboxide.** (1) Trademark for a mixture of ethylene oxide 1 and carbon dioxide 9 pts; a fumigant for insects in grain, tobacco, etc. (2) (not cap.) Carbonyl (obsolete). (3) (not cap.) The keto group.

**carbox metal.** The alloy: Pb 84, Sb 14, Fe 1, Zn 1%.

**carboxy.** Carboxyl.

**carboxyhemoglobin.** A compound of carbon monoxide and hemoglobin formed in the blood by carbon monoxide poisoning.

**carboxyl.** Oxatyl, carboxy. The acidic  $-COOH$  group. It determines the basicity of an organic acid. **c. nitrogen.** See *nitrogen*.

**carboxylase.** A yeast enzyme which splits the carboxyl group into carbon dioxide. **co-** Vitamin B<sub>1</sub> pyrophosphate.

**carboxylic acid.** A compound of the type  $R-COOH$ . See *acids, carbrylic acid*. Cf. *carbylic acid*.

**carboxymethylcellulose.** See *sodium c.m.c.*

**carboy.** Demijohn. A 10- to 13-gal glass flask protected by wickerwork; used for acids, etc.

**c. inclinator.** A support to enable a c. to be inclined and emptied easily.

**carbromal.** Adaline.

**carbo process.** A method of making color prints from color photographs.

**Carbosolide.** Trade name for silicon carbide.

**carburation.** (1) Carbonization as applied to internal combustion engines. (2) Carburization.

**carburet.** Carbide.

**carburetor, carburettor.** (1) A device for making illuminating gas by spraying oil on hot surfaces over which water gas passes. (2) The part of the internal combustion engine where full vaporization occurs.

**carburite.** A mixture of equal parts carbon and iron, for rebarbitizing steel in the electric furnace.

**carburization.** The dissolution of carbon in molten metals; as, steel produced by heating in a stream of carbon monoxide. **case-** Carburization on the surface.

**c. gas.** The production of a toughened surface layer of high-carbon steel by heating steel components in a carbon-rich gas.

**carburizing.** Carburization.

**carburolith.** A solid safety fuel which excludes flammable vapor under pressure. It consists of petrol-gum with 3% of a stabilizer (sodium silicate mixed with copper alginate and an excess of ammonia).

**carbylamine\*.** (1) Isocyanide. (2) Ethylisocyanide.

**carbylic acid.** An organic acid which has carbon in its acid radical; as: **ammonia-**  $R-CNH-NH_2$ , carbrylic, **aquo-**  $R-COOH$ , carboxylic, **thio-**  $R-CSSH$ , dithionic. Cf. *siliconic acid, stannonic acid*.

**carcel unit.** The brightness of the carcel lamp, burning 42 gm of colza oil per hour. 1 carcel unit = 9.6 candles = 7.5 German standard candles, q.v.

**carcinogen.** A substance which produces cancer in living tissues; as, benzopyrene.

**carcinolipin.** A crystalline lipid factor in egg yolk having carcinogenic properties.

**carcinoma.** A tumor originating from malignant epithelial cells, e.g., skin cancer (epithelioma).

**carcinomic acid.** An unsaturated fatty acid in cancerous serum and tissue.

**cardaissin.** A substance extracted from suprarenal glands of cows, a heart stimulant.

**cardamom.** The seeds of *Elettaria cardamomum* (Zingiberaceae), tropical Asia; an aromatic and a spice. **c. oil.** The essential oil of c., d.0.895-0.905; it contains terpinene, dipentene, and limonene. **Malabar-** d.0.933-0.943; contains cineol. **Siam-** d.0.905; contains borneol.

**Cardanol.**  $C_{20}H_{12}O = 288.30$ .  $m-C_{14}H_{7-C_6H_4-OH}$ . Trademark for a liquid obtained by the distillation of cashew-nut juice, b.100-225. Its esters are plasticizers.

**cardanolide.** Cardogenan. Describing the fully saturated system of digitaloid lactones; the configuration at the 20-position is the same as in cholesterol. Cf. *steroid*.

**cardiac.** Pertaining to the heart ( $\chi \alpha \rho \delta i x$  = heart).

**c. sedative.** A drug which lessens the frequency of heart action, as, aconite. **c. stimulant.** A drug which increases the force and frequency of the heartbeat, as, digitalis.

**cardiazole.** Pentamethylenetetrazole.

**carding.** An operation in the manufacture of woolen felts which opens up the material, mixes the fibers, and removes foreign matter, by the action of wire brushes.

**cardiogram.** The tracing produced by a cardiograph.

**electro-** A photographic record of the electric heart currents, which deflect a galvanometer mirror that reflects light onto photographic paper.

**cardiograph.** A device to record the movement of the heart, especially its force and character; a small diaphragm placed over the heart or artery transmits the heartbeat by air pressure to a recording diaphragm. **electro-** A sensitive galvanometer to measure the electric pulsations of the heart.

**cardioid.** Heart-shaped. **c. condenser.** A device to concentrate light in the ultramicroscope.

**cardogenan.** Cardanolide.

**Carolol.**  $C_{21}H_{38}O_2 = 314.3$ . Trademark for an irritant phenolic oil liquid from the shell of *Anwardium occidentale*, cashew nuts.

**carene.**  $C_{10}H_{16} = 136.2$ . 4,7,7-Trimethyl- $\Delta^3$ -nor-carene. A terpene group in essential oils. **d-** Colorless, sweet-smelling oil, d.0.8586, b.170; in Indian turpentine.

**Carex.** Red c. (Cyperaceae).

**Cargau.** Trade name.

**cargentos.** C. casein; a gel.

**Carica.** The (Caricaceae).

**Kryptoxant.**

**cariecin.** (1) Cf. *papain*.  
(2) *genetic*.

**Carissa.** A g. Asia and Af.

**carissin.** A g. stimulant.

**caritinoid.** C.

**Carius, Georg J.** C. furnace tubes.

**carlic acid.** (mold *Penicillium*).

**carlosic acid.** (fungus, *Penicillium*).

**Carlsbad salt** salt thermally by evaporation.

**Karlový V.** Artificial. S. badense. A sulfate 2, sc. 36%.

**Carl's solution.** alcohol, 60% acetic acid, 2%.

**carminative.** gas expulsion.

**carmine.** Cochineal. A mixture of stannates obtained from cochineal with soluble in an ammonia.

**blue-** See *indigo*.

**c. lake.** A  $C_{11}H_{12}O_7$  split product.

**carminic acid.** glucosidic hydrolysate of cochineal. P. water; a reagent for microscope staining. pH 5.5 red (acid).

**carminite.** A arsenates, and carmoisine.

**carmoisine.** A c. carmalite.  $KCl$  potassium, in many). Cf.  $MgCl_2-NH_4Cl$ .

**carnauba.** (1) *T. erifera*; or (2) Brazil wax, obtained from masses, m.83.

**carnaubic acid.** (wax and beef).